
V2a interneuron differentiation from mouse and human pluripotent stem cells.

Journal:	Nat Protoc
Publication Year:	2019
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PubMed link:	31628445
Funding Grants:	Engineering microscale tissue constructs from human pluripotent stem cells

Public Summary:

V2a interneurons are located in the hindbrain and spinal cord, where they provide rhythmic input to major motor control centers. Many of the phenotypic properties and functions of excitatory V2a interneurons have yet to be fully defined. Definition of these properties could lead to novel regenerative therapies for traumatic injuries and drug targets for chronic degenerative diseases. Here we describe how to produce V2a interneurons from mouse and human pluripotent stem cells (PSCs), as well as strategies to characterize and mature the cells for further analysis. The described protocols are based on a sequence of small-molecule treatments that induce differentiation of PSCs into V2a interneurons. We also include a detailed description of how to phenotypically characterize, mature, and freeze the cells. The mouse and human protocols are similar in regard to the sequence of small molecules used but differ slightly in the concentrations and durations necessary for induction. With the protocols described, scientists can expect to obtain V2a interneurons with purities of ~75% (mouse) in 7 d and ~50% (human) in 20 d.

Scientific Abstract:

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